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ORIGINAL ARTICLES.

ALPINE CLIMATE: ITS PHYSIOLOGY AND THERAPEUTICS.

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Introductory Considerations.

Experience has clearly established the fact that a holiday in the mountains for the healthy worker provides him with a remarkable renewal of mental and physical powers, which enables him to return to his duties with quickened forces and helps him in the resistance of disease. And since such undoubted benefits are seen to be derived from a short holiday by the normal healthy individual, it is natural that medical men should not be slow in seeking for the delicate, sick, and convalescent the healing and invigorating influences associated with residence in Alpine resorts.

In considering the selection of cases and arranging for the particular health station best suited to each individual, it is necessary that

advice should be based upon actual knowledge of the physical and mental characteristics of the patient, as well as the nature and extent of his disease; and the medical man should also be acquainted, as far as possible, with the conditions obtaining in the particular region chosen. In too many cases advice is given and decisions arrived at in a haphazard kind of way, with a very perfunctory study and a superficial understanding of these all-important data. Patients are often urged to go to Switzerland without any idea of the kind of place to which they are going, and, indeed, in many cases the person who gives the advice is unable to provide this very requisite information.

The success of a course of treatment for tuberculosis away from home depends largely on the interaction between the mental and physical powers of the patient and the various therapeutic agents in his surroundings. An accurate and reliable estimate of any particular patient's mental and physical make-up can only be reached by way of a complete study of him from these standpoints. This demands knowledge, sympathy, and sound judgment. Some cases are sent away from their own homes when they would undoubtedly be happier and have a better chance of coping with their disease if supported by the presence of their relatives and friends in an environment to which they are accustomed. But, on the other hand, there is no doubt that many patients, especially those in the early stages of tuberculous disease and at a time when it is certainly curable, are retained in their own homes when the greatest possible benefit might result from a period of residence in a suitable Alpine station. The misleading idea has arisen among some doctors that a patient should seek cure in the place where he has afterwards to live. It is difficult to discover the sense or reason of this statement, and yet it is heard from patients many times in the course of a year. Surely it is wiser to take the early case as soon as diagnosed, at a time when there is every chance of a proper recovery, and to send the patient right away from the climate in which the disease was developed.

For many years, in dealing with the influence of climate from a therapeutic point of view, advice and opinion have been governed almost solely by practical experience—in a word, by empiricism. But during recent years scientific knowledge has been accumulating regarding the nature and action of the various factors in the maintenance of health by means of climate as well as its effects upon disease. The object of the present communication is to provide in a concise and convenient form such practical information and guidance as may be of service to medical men and others responsible for advising or supervising residence in the Alpine stations of Switzerland for those who are predisposed to, or actually victims of, tuberculosis. We are considering a height of 5,000 to 6,000 feet above sea-level, since it is at this height

that the greatest and most permanent benefit has been found to result.[1]

Physiological Considerations.

The normal working of the body is contingent on certain meteorological conditions, the medium for which is the air. The air holds gases, dust, and moisture, and acts as a vehicle of heat, a modifier of light, and a conductor of electricity. The effects of these varying phases of matter and energy on the human organism are of great interest, and though much yet remains to be discovered, a brief summary of those at present within our knowledge may be attempted, in so far as they concern mountain climate. The changes that result from residence at a high altitude have a number of special features, and in preparing these notes much valuable information has been derived from the writings of the late Dr. W. R. Huggard and Dr. Leonard Hill already referred to in this article.

When climatic influences are modified by an increase of altitude, the organism undergoes physiological modifications to meet the new conditions. Subjectively, there is a feeling of stimulation, and the basis of this is probably a series of changes of a functional kind, only some of which are well understood.

In the mountains the barometric pressure is low in proportion to the height above sea-level, and the partial pressure of oxygen is correspondingly diminished; the physiological result is that breathing is deeper, for the pulmonary ventilation has to be increased if the tissues are to receive their proper oxygenation. The tenuity of the atmosphere, combined, indeed, with other influences—such as brighter light—leads also to an enrichment of the blood, so that there is a greater amount of hæmoglobin in circulation, and a larger number of red corpuscles to carry it. At a height of 5,000 feet, for example, the increase may amount to from 20 to 30 per cent. The increase of hæmoglobin and red corpuscles is not an apparent one due to a diminution of plasma, but a real augmentation, and, indeed, it appears from animal observations that the total amount of blood is even

[1] Many works have been written on the climatic treatment of disease, and in most of these reference is made to tuberculosis. A valuable chapter on tuberculosis will be found in "A Handbook of Climatic Treatment, including Balneology," by the late Dr. William R. Huggard, for many years British Consul at Davos. The work was issued in 1906 by Messrs. Macmillan and Co., Ltd.

The most complete and up-to-date description of the nature, action, and practical application of physical facts usually classified under the headings of meteorology and climatology, and dealing with aerotherapy, heliotherapy, and other influences active in the so-called open-air treatment of tuberculosis, will be found in the two volumes prepared by Dr. Leonard Hill, acting under the Medical Research Council of the Privy Council: "The Science of Ventilation and Open-Air Treatment," by Leonard Hill, M.B., F.R.S., Director of Department of Applied Physiology, Medical Research Committee, Part I., 1919, pp. 249; Part II., 1920, pp. 295. Published for the Medical Research Council of the Privy Council by His Majesty's Stationery Office, Imperial House, Kingsway, London, W.C. 2.

increased. It has also been observed that an increase of lymphocytes occurs—a finding of especial interest with reference to tuberculosis. The air at higher altitudes is richer in oxides of nitrogen (the so-called "ozone"), which possibly have some beneficial action on the respiratory tract.

Mountain air is almost free from dust, more particularly when the snow is on the ground, and is therefore less irritant to the respiratory passages. The presence of silica in dusty air has been shown to be particularly deleterious, and, as it were, an activator of tuberculosis. Dust also includes bacteria, and from these mountain air is almost entirely free.

There is very much less moisture in the air of mountains than at lower levels, and this dry air has a stimulating effect on the respiratory membranes. Hill considers that the beneficial action is due to the fact that, since the air breathed out must be saturated with water-vapour at the body temperature, the mucous membrane is subjected to a greater flow of blood and lymph, which have a cleansing action discouraging to infections. And, again, because of the low humidity, while it is warm in the sunshine, it is cold in the shade (there may be a difference of 50° C.), and Hill has further shown the powerful effect of this in stimulating metabolism. The greater cooling of the body by reason of the cold air and the evaporative power due to its dryness necessitates a greater production of body heat, and so an increase of metabolism. One lives more intensely and at a greater speed. The cooling power of Alpine air, as measured by Hill at Montana with his katathermometer, is three times greater than in ordinary conditions indoors, and the evaporative power twice as great; the result is that heat production may be raised from 40 to 90 per cent., according to the degree of exposure; wind leads to still further increase of heat production. The heightened metabolism thus induced leads to a general tonic effect: the appetite is stimulated, and there is a more ample circulation of nourishment to meet the extra demand.

It is well known that the absence of light has a deleterious effect on the human organism. The successful practice of heliotherapy has abundantly demonstrated the beneficent power of the sun's rays, although the more precise nature of their action remains largely to be explained. From a number of causes, the heating and lighting powers of the sun are greatly increased at the higher levels. They are rendered more available because they are much less obstructed than at low levels, Roget stating that at sea-level 32 per cent. of the heating effect of the sun is lost, whereas at a height of 3,000 metres only 11 per cent. is lost. The low humidity and the comparative absence of dust leave the air purer and therefore more highly diathermanous. Then, again, there is a longer duration of sunshine, especially on the southern

slopes of valleys, and especially in winter, owing to the relative rarity of clouds. In winter, too, the sun's power is greatly enhanced by the reflection of its radiant energy from the snow-fields. In the higher Alps, then, there is sunshine of a more extended duration and greater intensity than at lesser altitudes.

Exposure to sunshine has both local and general effects, the most obvious of which are sunburn and pigmentation. The local response of the skin, sunburn, or *erythema solare*, is an inflammatory reaction which may be beneficial in some local morbid conditions, but which must in any case be carefully controlled, since a deep burn may follow an excessive exposure. Like sunburn, tanning is evidence of a heightened metabolism of the skin, and its occurrence is of great practical moment, although its exact significance remains obscure. People vary greatly in their susceptibility to tanning, some entirely failing to tan. It may be said that in general this pigmentation of the skin is associated with a resistance to disease. The local disease-resisting effect may be exemplified by the facts that acne never occurs in cases being treated by heliotherapy, and that small-pox pustules avoid tanned skin. But this tanning has relations to remote as well as to local conditions, for it has been found that tanning of the skin is associated with amelioration of morbid conditions in internal organs, and in those who do not tan, these remote benefits of exposure to the sun are lacking. Considering, on the other hand, that exposure of the tanned skin to the sun may be followed by an exacerbation of such signs (*e.g.*, a focal reaction in pulmonary tuberculosis comparable to what may follow a dose of tuberculin), it is believed that the pigment of tanned skin is of a protective nature, saving the deeper tissues from the action of rays having an unfavourable effect. The tanned skin is no longer liable to sunburn. These considerations indicate that heliotherapy is a double-edged weapon, to be used only with a knowledge of its capabilities. The bio-physics of the matter are obscure; the penetrative power of the sun's rays varies with their wave-lengths, only the red-yellow rays having any great power of traversing the skin, although Malgat states that some of the rays may even pass through the depth of the body and affect a photographic plate on the other side —a statement doubted by Rollier. Now, it is known that certain fluorescent substances—*e.g.*, eosin—are able to transform short-wave (sunburning) rays into long-wave (heat) rays, and Rollier and Rosselet have suggested that the pigment of tanned skin exerts a similar function, protecting in this fashion the deeper tissues from the detrimental effects of short-wave rays. These latter, therefore, provoke the formation of a barrier to prevent sunburn and the concomitant general disturbances.

Sunlight has a direct bactericidal action, which is utilized in the

treatment of superficial infective conditions, and also a stimulating effect on the healing of wounds and ulcers. It has also an analgesic property of therapeutic importance, and the great warming power of the Alpine sun while yet the air is cool and evaporative may be again referred to in its relation to metabolic stimulation. In this connection, too, it may be recalled that exposure to sun and air has a tonic effect on muscle, so that even an immobilized limb does not atrophy as it would when bereft of these influences. This is doubtless to be correlated with the fact that muscle plays a large part in heat production, and the importance of exercise for the same reason is obvious.

There are some indications that electrical disturbances and radioactive phenomena may have some action on the organism, but as yet no definite statement can be made.

The universally recognized psychological effect of sunshine is elsewhere remarked upon in this paper.

Acclimatization to mountain climate consists in adaptation to the changed meteorological conditions. Increased pulmonary ventilation, the enrichment of the blood, the strengthened action of the heart, the response of the skin, alimentary tract, and kidneys to the altered metabolic demands establish the vital mechanism at a new level. Visitors to a height of 5,000 feet seldom suffer much inconvenience, but slight degrees of headache, sleeplessness, lassitude, flatulence, and breathlessness are to be met with sometimes. Acute symptoms are probably due to the liberation of gases in minute quantities in the tissues, owing to the lowering of barometric pressure, and they are proportional to the rapidity of ascent. Since the new gas pressure relations are quickly established, these symptoms are transient, and need no great consideration at such an altitude as that being discussed. Such discomforts do not last longer than ten days, if they occur at all. The young, who bear cold better, acclimatize more rapidly and thoroughly than the old.

While a great deal remains to be explained and discovered, the important deduction may be reached, after such a rapid survey of the subject, that a patient must have the ability to carry out the physiological modifications demanded before he is enabled to combat his disease with the strengthened weapons that Alpine residence provides.

Therapeutic Considerations.

Following upon the previous remarks concerning general conditions, and specially the physical and physiological factors obtaining in the mountains at a height of 5,000 feet, we may now consider the question of residence in the Alpine climate from the therapeutic point of view, especially having regard to that commonest of all diseases, and that for which people are most often sent to the mountains—namely, tuberculosis. Tuberculosis in all its forms, whether pulmonary or surgical (that is,

tuberculosis of bones, glands, joints, or serous membranes), is, without doubt, considerably influenced by climatic conditions. In fact, in many cases climate is such an important element in the treatment of this disease that it is not too much to say that it may easily be the deciding factor as to what course the disease will take—in other words, whether the patient will get well, become a hopeless invalid, or die. It is a pity that this all-important question of seeking a really suitable climate for patients affected with this disease, especially (and this is a most important point) in the early cases, is so often overlooked and neglected. The malady has frequently already obtained such a hold upon its victim as to make ultimate cure impossible.

Direct attack upon the various forms of tuberculous disease is, in our present state of knowledge, often very difficult, or even impossible. Indirect attack, then, remains the most satisfactory means which we have at present for coping with tuberculosis. By indirect attack is meant a modification of tissue change and improvement of the general health and nutrition, thus raising the reactive and resistive power of the patient, and enabling him better to fight his disease. The best way in which this result can satisfactorily be obtained is by the judicious and considered use of "climate."

In dealing with any particular case of tuberculosis of the lungs, there are two essential points which demand the consideration of the physician. One is the present general health and condition of the patient, and the other his probable power of reaction and resistance to disease.

The first requirement is to consider in any case of tuberculosis the state of the patient as regards his general nutrition, and the aim and object must be to raise this to the highest possible level. A great point was sometimes made, especially in former days, of increase of weight, and it was thought that increase of weight must mean that the patient was progressing most favourably towards a cure. These efforts at fattening frequently resulted in flabbiness, diminished power of resistance, and chronic dyspepsia, and ultimately did definite harm.

Referring back to the remarks of the physical and physiological conditions at an altitude of 5,000 feet, it would be seen that at this height conditions tend considerably to improve the general health and resistive power of the patient; but it should be remarked here that cases must be carefully chosen, and that it is the reasonably early cases with still plenty of kick and vigour in them who do best in the mountains. It is useless to send up to a height persons enfeebled, emaciated by long-standing tuberculous disease, and with no power left in them to respond to the more exacting demands which are made upon the organism. A patient suffering from tuberculosis, whilst the disease is in the very early, acute, and active stage, should, as a rule, not be sent

away from home until the acute process has settled down. In this stage it is much better to keep him at absolute rest in bed until the most acute symptoms have subsided. There are many second, and even third stage cases who do quite well in the mountains, although, of course, they must not expect a complete cure, but one knows of patients with old extensive fibrotic disease who, winter after winter, return for a sojourn in the Alps, having found out that by so doing they gain fresh power of resistance and energy, and are thus enabled to carry on their occupation and work during the rest of the year.

Old-standing cases of phthisis, especially in elderly men with much fibrous tissue formation and with thickened arteries and heightened blood-pressure, should not be sent to an altitude. They are not comfortable, and often get an increase of their catarrh, and as a general rule do badly. One often hears the remark that hæmorrhage cases should never be sent to the mountains. This is true, perhaps, of that type of disease of which we have just been speaking—namely, the chronic fibrotic cases in elderly people, with increase of blood-pressure —but it certainly does not apply to the hæmoptysis occurring in young people in early, or not very advanced, stages of the disease. These frequently do very well in the mountains. The Alpine climate is also very beneficial for the after-treatment of successful cases of artificial pneumo-thorax ; the general health and condition are improved, and the patients usually do exceedingly well.

For cases of surgical tuberculosis—*i.e.*, tuberculosis of the joints, bones, glands, and serous membranes—a mountain climate is eminently suitable, especially during the winter months, for then the sun cure or heliotherapy can be carried out under the most favourable conditions. The radiant energy of the mountain sun is much more active in the clear, thin, pure air of the mountains than at lower levels, where the rays are filtered through layers of heavy, humid atmosphere holding in suspension dust, smoke, and micro-organisms. As above mentioned, this contrast is more marked in the winter than in the summer, largely owing to the presence of snow on the ground, which appears to increase the power of the sun, and of course prevents all possibility of dust.

In the first place, sun treatment is most intimately associated in one's mind with localized or surgical tuberculosis, and in this connection young patients and children do very much better than those of more advanced years. Dark-haired subjects, as a rule, do better than fair-haired ones, as they pigment more easily and deeply, and the cases who pigment the most seem generally to derive the most benefit. Red-haired people are the most difficult of all, and do not appear to be able to tolerate the sun well, so that one has to accustom them to exposure very carefully and gradually. Tuberculous glands, bones, and

joints in young subjects do exceedingly well, the effect of the sun being apparently to cause the absorption and disappearance of adhesions, and the restoration of movement to joints which were previously stiff. Other conditions which derive much benefit from heliotherapy are chronic peritoneal tubercle and tuberculous abdominal glands.

In connection with surgical tuberculosis, it must be mentioned that abscesses should not, as a rule, be opened by surgical means. Very many of them, if given the sun treatment and aspirated at suitable intervals, absorb and disappear. We may recall here a case which has recently been under our observation in a young man aged twenty-four, with tuberculous disease of the right sacro-iliac joint, and a large abscess in connection with this pointing outwards. This patient was in bed for two years sun-curing, and had also repeated aspirations of the abscess. He returned home to the Colonies a short time ago perfectly cured and soundly healed; the abscess had then been dry for six months, and all that remained was some thickening round the original site of the disease. There are, of course, many other similar cases.

We have seen at least two cases of double renal tuberculosis which appear to have been very much benefited by sun treatment. Open tuberculous lesions, sinuses, and fistulæ in connection with joints and bones close and heal in a remarkable manner under the sun's rays. Others, not tuberculous, such as unclosed empyemata, sinuses, ulcers, and other septic conditions, frequently derive much benefit from a course of sun-baths. Cases of lupus improve with the sun treatment, as do many other chronic skin diseases. We may mention again that in heliotherapy there comes in once more the factor of the power of response, and, as we have mentioned above, it is in young and especially in dark-haired people that the best results are obtained.

A word of warning, however, should here be given. Whilst the sun treatment scientifically carried out is so very beneficial in many cases of surgical tuberculosis, it should not be used as a general rule in pulmonary cases. There may be, it is true, a limited number of pulmonary cases in which a modified sun treatment might be tried, but, as a rule, it is definitely harmful for patients with tuberculosis of the lungs to sit about uncovered in the sun. Congestions, hæmorrhages, and activity are often produced in this way.

Another type of individual for whom a mountain climate is eminently beneficial and suitable is the sub-tuberculous type of case—in other words, a predisposed individual in bad general health, and in whom the presence of the disease is suspected, or who is predisposed to it, and especially if of bad family history. Backward children with adenoids, general debility, and a tendency to catch cold and catarrh do excessively well in a mountain climate. Among other pulmonary

patients, those affected with bronchial asthma derive enormous benefit from a sojourn in the Alps.

In many years of experience we have never seen an attack of asthma in a mountain resort, although many asthmatics have been under observation. Unfortunately, however, there is a tendency to relapse on return to a lower level; but even then, if several months can be given up to the "cure," permanent benefit often results.

Tuberculous ulceration of the larynx, if unaccompanied by great irritability and congestion of the mucous membranes, as a rule does well in the mountains; but, of course, it is no use sending pulmonary cases in the third stage with extensive laryngeal involvement, for they are made more unhappy and uncomfortable in the dry climate of a high altitude, and derive no benefit.

Bronchial catarrh, if occurring in young persons, often does extremely well in the dry climate of the mountains, but in old people, when it occurs as a complication of long-standing phthisis, or accompanied by emphysema, the results are not good; the patient is uncomfortable and breathless, and the catarrh, congestion, and irritability of the mucous membranes are increased. In these elderly people, too, the power to respond to a cold, dry climate is often lost, and too great a strain is thrown upon the heart. This class of case would do better and be more comfortable in a warmer and less dry climate.

Besides tuberculosis, there are a number of other morbid conditions which may here be considered as to suitability or the reverse for their treatment at high altitudes, and it will be convenient to consider these *seriatim*.

Debility.—There is a large class of patients whose only complaint is that they are run down both mentally and physically, and are unable to follow out their usual work and occupation satisfactorily. On examination and inquiry, they may be found to be in perfect physical condition, with no organic trouble, but have been exerting themselves beyond their powers, probably over a long period without a holiday. The symptoms of which the patient complains are really not those of any disease, but merely evidences of over-work and "staleness." Such a case, assuming that there is no organic trouble behind it (and this must always be carefully excluded), needs essentially a change away from his usual surroundings to a health station where there is freedom from all sources of worry. This type of case, if in good general health, will rapidly recover all his vigour and power of concentration after a brief sojourn in the mountains.

Anæmia.—There have been mentioned in a previous section the effects of a mountain climate upon the blood—that is to say, in those patients who respond to the increased demands made upon their constitution by such a climate. The number of red cells is considerably

increased, and also the percentage of hæmoglobin. With these considerations, one would expect an ordinary, uncomplicated anæmia to do remarkably well in a mountain climate, and, indeed, such is often the case; but it must be remembered that anæmia, as a rule, is not a disease, but is merely a symptom associated with some other pathological condition. It may, for instance, be one of the symptoms of tuberculosis, rheumatism, oral sepsis, malaria, and a number of other maladies; or it may be due to direct loss of blood. In these cases, of course, the fundamental factors must be traced and treated in a suitable manner.

Obesity.—Referring again to the physical section of this paper, it is seen that climate has a marked influence over tissue change. The metabolic process goes on at a greater rate, and greater demands are made upon the constitution of the individual. Arguing on these lines, one would expect it to be difficult for people to lay on fat in the mountains, and would also argue that people who are fat would tend to lose it. This is true to a certain extent, and it is a matter of common knowledge that persons do not very often gain much weight whilst in a mountain climate, even if improving in the best possible way as regards their health; but, on the other hand, weight is often rapidly laid on after returning to a lower level from residence in the mountains, especially in those cases who have made a good recovery. A contrary argument here comes in, for, owing to the increase of the rate of metabolism, there is greater demand on the patient's part for food. In other words, the appetite, as a rule, in healthy people increases sometimes very greatly at high altitudes, and often more than balances the increase of tissue change, with the result that a person, instead of losing weight, puts it on. It must be remembered also that the question of obesity is one depending on food, diet, and régime rather than on climate. Unfortunately, fat, flabby people are usually not only fat and flabby physically, but are also endowed with fat, flabby wills, and cannot bear to give up indulging themselves with the articles of food, etc., which they know to be bad for them.

Catarrh of the Upper Air Passages.—In dealing with this question one must, of course, seek for the fundamental origin of the catarrh. This may be due to any one of a number of different conditions—for instance, asthma, bronchitis, hay fever, neglected "colds," smoking, long residence in a dusty atmosphere; or it may occur as a complication of a tuberculous infection of the lungs. For long-standing catarrh, especially in elderly people, it is probable that a warm, equable climate is more suitable than the cold, dry Alpine weather. If the mucous membranes are in a very irritable condition, the dry cold of the mountains only serves to aggravate and increase the discomfort of the patient. Asthmatics and patients afflicted with hay fever often make

quite a remarkable recovery in a high, dry climate. Catarrhs in young people—due, for instance, to adenoids, enlarged tonsils, or neglected colds—are very suitable for treatment in the mountains, the results being, in cases of this kind, exceedingly good. The same argument applies when considering the bronchial catarrh which is so often an accompaniment of pulmonary tuberculosis. If occurring in old people, especially if the disease is of considerable standing and accompanied by irritability of the mucous membranes, the dry, thin, cold air of the mountains will probably cause increased irritability and discomfort and more secretion. On the other hand, young people suffering with bronchial catarrh, whether this be due to a neglected cold, an attack of measles, or to the many other conditions which may produce it, or whether occurring as a complication of tuberculosis, frequently gain much benefit from a period of residence in the cold, dry climate of the Alps.

Affections of the Heart and Circulatory System.—The action of the heart is undoubtedly greatly influenced by altitude, and this is brought about by the fact that, as one ascends to higher planes, more demand is placed upon the heart and it is called upon for more work. At least two factors contribute to bring this about: Firstly, the air is thinner and more rarefied, the tension of oxygen being less than at lower levels. Secondly, owing to the increase of tissue change and metabolism generally, more oxygen is consumed. The whole question of whether to send a cardiac case to the mountains depends on whether a patient will react favourably to these altered conditions. In many cases the heart is definitely improved and strengthened under these circumstances, whilst in others it is unable to respond to the increased demand made upon it, and the results in these cases are disastrous. A medical man, then, is called upon to make a decision as to whether or not the patient's condition—and especially his cardiac mechanism—will be benefited or the reverse by a high mountain climate. This seems as if it would be a difficult thing to decide, but in reality, if one really follows out a few simple considerations, it is not so difficult as it seems. Firstly, then, as a general rule, patients with uncompensated valvular lesions should not be sent to a high altitude. If the lesion is not a very severe one and is thoroughly well compensated, then there is no contra-indication against a mountain climate, and such cases frequently improve and do really well. If the valvular lesion is a severe one, then often, even if compensated, ascent to a height might cause a breakdown of the compensation. There is another type of cardiac case, speaking generally, where there is merely feebleness and weakness of the heart muscle, this being part of the patient's general condition. These cases do very well in the mountains as a rule, the cardiac condition being simply part of the general debility and improving as the

patient's health improves. Conditions accompanied by much arterio-sclerosis and high blood-pressure should not be sent to the mountains. In this connection it must be noted that there is a type of old-standing tuberculous disease of the lungs, with much fibrous tissue formation, the patients generally being elderly men of forty-five to fifty-five years of age. The disease has probably been going on for years, and it is likely that there are one or more cavities in the lungs. These cases are often of plethoric type, and have general thickening of the arteries with raised blood-pressure. Such cases are unsuitable for a mountain climate, even if the general condition is good. They are liable to hæmorrhage at any considerable altitude, and it is indeed this particular variety of the disease which has given rise to the popular idea that hæmorrhage cases should never be sent to a mountain climate. Whilst the statement is indeed true with regard to this special type of case, it is certainly untrue if applied to the hæmoptysis of reasonably early phthisis, especially in a young person. This latter case is very suitable for mountain treatment, and generally does extremely well.

Affections of the Digestive System.—The digestive system is influenced greatly by climate according to the particular kind of case under consideration, and follows out the general rule of response to altered conditions. A robust patient, with good resisting power, but in whom the digestion is poor and the appetite bad, will quickly improve in the mountains. On the other hand, the weak, feeble creature, with no power of response left, will be very much better as regards the digestive functions in a warm, equable climate. Those with chronic intestinal catarrh generally do badly and are very uncomfortable at high altitudes. Mountain sickness and hill diarrhœa need not be touched upon here, as they do not occur until very considerable heights are reached, such as 10,000 or 12,000 feet above sea-level.

Derangements of the Nervous System.—Here, again, is a very important question to be considered, and one which goes hand-in-hand with the physiological considerations upon which we have already touched. As a rule, persons with a good power of response do well in the mountains as regards their nervous toleration; they eat well, sleep well, and keep happy, contented, and restful. But there is another type in whom long residence in a mountain climate appears to cause distinct nervous unrest, especially if they are much shut in by mountains. They get the idea that the mountains are pressing in upon them and falling upon the top of them, and they have a longing to get over the other side, as it were. This is accompanied by irritability of mind, insomnia, and general restlessness. For cases who are getting into this condition the only thing to do is to send them away for a change, and they often return in perfect content to continue treatment again, say, for another six months, when the same train of

symptoms begins to make its appearance once more. Some persons are quite content to spend a year or more at a mountain resort, especially if they feel that they are getting well, but there are many for whom it is certainly beneficial to get away for a short change (if their physical condition permits of it) every few months. It keeps them going, and the "break" helps them through the long, tedious process of the "cure." It must be understood in this connection that we are discussing the nervous system in connection with tuberculosis, especially of the lungs.

Rheumatism.—It is very difficult to say whether a rheumatic patient will do well or not in a mountain climate. To use an old Yorkshire expression, "Some does and some doesn't." It may at any rate be said that the acute or subacute rheumatic fever patient, especially if the disease is accompanied by endocarditis, should be sent at once to a warm or temperate climate. On the other hand, the ordinary patient, with chronic rheumatic joints, etc., especially if elderly, appears frequently to gain benefit by residence in the mountains. Muscular rheumatism is a minor complaint which one frequently observes amongst patients at a mountain resort, and although generally of no importance, it is a very uncomfortable condition, and is certainly more common there than in the plains.

A Study of Clinical Cases.

In order to ascertain the beneficial and lasting effect of treatment at a high altitude, a "questionnaire" was sent to all former patients who had been in residence at the English sanatorium at Montana, and who, since the completion of their course of treatment, have been working and living for from at least two to three years in England. The main questions asked were as follows: (1) What has been the state of your health since your departure from this sanatorium? (2) What is the present state of your health? (3) What amount of exercise are you able to take? (4) Are you able to lead an active life?

Among the large number of replies received a few specimens may be referred to.

Case 1.—Female, age 30. Infiltration left apex. Hæmoptysis. T.B. +. Early case; six months' treatment in winter in the Alps. (1) Quite excellent, except for an attack of whooping-cough last spring, which did not affect me in the smallest degree. (2) It could not be better. (3) Tennis, swimming, long walks, dancing. (4) Yes.

Case 2.—Male, age 34. Permanent tracheotomy after gun-shot wound of larynx in the war. Involvement of left upper lobe. T.B.+ febrile. Moderately early case (say six months). (1) Very good indeed, and no relapses. (2) Excellent. (3) Any amount. (4) Yes.

Case 3.—Male, age 25. Wide-scattered involvement of left lung

and part of right. Febrile. Sputum T.B.+. Made remarkable recovery. Two years' treatment. (1) Except for one slight attack of influenza during the winter, good all the time. (2) Good. (3) A quiet game of golf and any amount of walking. (4) Yes, with discretion.

Case 4.—Male, age 21. Surgical tuberculosis. Both kidneys involved; diagnosis confirmed by catheterization of ureters. T.B. once found in urine. Under treatment for two and a half years; sun-baths; careful diet. (1) Good. (2) Good. (3) From three to four miles per day. (4) Not yet.

Case 5.—Male, age 31. Very severe, old-standing, extensive involvement of left lung and apex of right. Much fibrosis. Dyspnœa on exertion. Sputum T.B.+. Two years in the Alps. (1) Very fair. (2) Fairly good. (3) Several miles per day. (4) Yes.

Case 6.—Male, age 40. Severe early case. Involvement of left upper lobe. Pleurisy left base. Tuberculous laryngitis. Febrile. Hæmoptyses. Sputum T.B. always +. Eight months in Switzerland. (1) Good. (2) Good. (3) Thirty-six holes at golf. (4) Yes.

Case 7.—Male, age 46. Early slight infiltration, localized at right apex. Made excellent recovery. Eight months' treatment. (1) Very good indeed. (2) Quite satisfactory. (3) Plenty of walking, but not capable of much running. (4) Yes.

Case 8.—Male, age 32. Early slight involvement left apex. Patient is a medical man. T.B. +. Recovered perfectly. Two years in Switzerland. (1) Good. (2) Good. (3) Tramp over twenty miles a day through long grass in tropical Africa with a rifle. (4) Yes.

Case 9.—Male, age 27. Early case. Involvement of right apex. T.B. +. Uneventful recovery. Six months in the Alps. (1) Excellent. (2) Excellent; I return to the tropics at the end of the year. (3) Anything I like; heavy rowing, swimming, several thirty-mile walks. (4) Yes. I have recently finished a really heavy year's research work, which took it out of me severely. Had the disease still been latent, it would have reappeared, I think, under the strain.

Case 10.—Male, age 26. Pleural case. Thickened pleura right lung. No definite intrapulmonary signs; no sputum. Six months' treatment. (1) Excellent. (2) Excellent. (3) Six to eight mile walks; playing tennis and golf; also small amount of rowing. (4) Yes.

Case 11.—Male, age 28. Another pleural case following gunshot wound right lung. Right side much contracted. A little sputum, in which a few T.B. were occasionally found. Six months' treatment. (1) Very good. (2) Very good. (3) Tennis and a certain amount of cricket and golf. (4) Yes.

Case 12.—Male, age 21. Severe scattered case of both upper lobes, with fever. Hæmoptysis. Sputum T.B. +. Two years in

Switzerland. (1) Still slight activity in right upper lobe. (2) Still slight activity, but much improved. (3) Six miles per day. (4) No.

CASE 13.—Male, age 36. Slight early focus at right apex. Two winters in the Alps. (1) Good. (2) Good. (3) Play cricket and golf. (4) Yes.

CASE 14.—Female, age 29. Pleural case chiefly, but had a little sputum, in which a few T.B. were always present. Made excellent and quick recovery. Ten months' treatment. (1) Splendid. (2) Better than ever it was. (3) Playing tennis matches and tournaments. (4) Yes.

CASE 15.—Male, age 47. Early focus right upper lobe. T.B. +. Pleurisy left base. Febrile and active. Three years in Switzerland. (1) Good. (2) Constant morning cough, but normal temperature, and increased weight and strength. (3) Two walks of four miles per day. (4) No.

CASE 16.—Male, age 27. Extensive superficially scattered disease in both lungs. Sputum containing T.B. Hæmoptysis. Two winters' sojourn under treatment in the Alps. (1) Very good. (2) Good. (3) Walking unlimited. (4) Yes.

CASE 17.—Male, age 30. Early focus right upper lobe. Patient was a medical man. Two years' treatment at Alpine resorts. (1) Variable. (2) Fairly good; no cough or sputum. (3) Walking and bicycling five to six miles daily. (4) Doing about six hours daily in general practice, including a little surgery.

CASE 18.—Male, age 24. Tuberculous disease of the right sacro-iliac joint, with abscess formation. Two years on his back in bed. Sun treatment. Repeated aspirations of abscess, resulting in cure. (1) Excellent. (2) Very good. (3) Almost normal. (4) Not yet allowed to.

CASE 19.—Male, age 42. Severe and long-standing case of bronchitis and asthma. Six months' sojourn in the mountains; complete freedom from attacks during this time. Returned to England six months ago, and has not yet had a relapse. (1) Very much improved. (2) Good. (3) Normal amount. (4) Yes.

CASE 20.—Boy, age 14. Thin, anæmic, backward, delicate boy, suffering from frequent and severe attacks of asthma. Eighteen months resident at 5,000 feet altitude. Result: Great improvement in general condition; continued increase in weight; disappearance of all asthmatic and bronchial signs and symptoms. Returned home eighteen months ago, and has continued his improvement and had no relapse.

The above summaries of the histories of actual cases are interesting as showing that if only sufficient time (and this, after all, is the most important thing of all) can be given to care and treatment in an Alpine resort, those who react favourably to the conditions of climate there

obtain results both excellent and permanent. Time, however, is necessary, and the usual three months, so often advised, is not nearly long enough, and is frequently wasting both trouble and money and giving false hopes to the patient.

Psychological Considerations.

The psychology of the tuberculous subject is a subject of profound interest and much practical importance. After a complete examination and full study of the physiological and pathological factors in a given case, the wise physician will consider the psychological aspect before venturing on a prognosis or deciding on a course of treatment. In selecting cases for Alpine treatment, and in deciding on the particular Alpine station or sanatorium to which patients can be sent, the psychology of each case must be investigated in all its bearings. Undoubtedly much of the benefit resulting from residence in mountain sanatoria is due to the mental reaction of the patient to his environment. It should here be noted that for the majority of English patients, at all events, it is most important to secure such skilled medical and nursing supervision and care as will be congenial and in every way in harmony with the particular needs of the patient.

This is not the place to describe and discuss the psychological features which are prominent and influential in the various groups of tuberculous subjects; our desire is to indicate the importance of this aspect of the problem, realizing that a neglect to give adequate consideration to the mental and moral outlook and temperamental constitution of a patient and his general reaction to therapeutic procedures and environment may delay recovery, or even prevent full and permanent restoration.

It is particularly helpful to the physician to obtain the patient's fullest confidence, and to be able to view the situation in all its bearings from the patient's standpoint. Recognizing this, we have asked certain patients who have been long resident in the mountains to describe briefly the effect of their surroundings upon their mental and physical condition. We are able to quote from four of these impressions. The first is a short essay written by Dr. Bernard Stracey, for many years in practice in England, and now resident in the Bernese Oberland for the sake of his health. Two are by lady patients: one has been in bed continuously for three years, at first desperately ill, but now, thanks largely to her mental grit, steadily, but surely, improving; another has also been a bed case for the last two years, during which time she has been in the Swiss Alps.

Communication I. (kindly supplied by Dr. Bernard Stracey).—"I have been asked to contribute a few notes on the mental effect of life in the Alps and its bearing on tuberculous cases. My acquaintance with the

higher parts of Switzerland extends over a period of thirty years, during the latter part of which period I have been continuously resident here. This has enabled me to notice the results of climatic changes on myself and others after living for a considerable time amongst the Alps.

"There are few people in good health who do not feel the invigorating and cheering influence of a bright, sunny day. Does not everyone after a spell of gloomy weather welcome the return of sunshine and feel the better for it? In our northern island we have grown accustomed to living for a large part of the winter under sunless skies, and when health and work can occupy the individual, this absence of sunshine makes little difference to his cheerful outlook on life and to his vigour. A very different result is produced in the case of the tuberculous person with his weakened vitality; gloomy skies and damp atmosphere, which to the healthy individual are of little or no account, produce in him depression, malaise, and often chill. The warming and cheering influence of sunshine seems to me for this reason alone to be of paramount importance in the treatment of tuberculosis. Apart from the demonstrable physiological effects of sunshine on the human body, there is a subtle effect of well-being produced which is probably also due to some definite physiological change so far undetected, and its absence for a lengthy period does produce in many people a craving for its return. This craving, which is much more marked when the vitality has been low, may be referred to one of the primitive necessities of man, now much obscured by civilization, and, unfortunately, by many of my colleagues, unobserved.

"If it be granted that sunshine is of importance for the well-being of the healthy and vigorous, and of greater importance still for those with weakened vitality, it is our duty to establish such invalids in the sunniest climate possible. Can anyone maintain that the British Isles have in winter such a desirable distinction? Probably not, and for that reason alone it is necessary for a tuberculous case to leave our northern island during the winter months.

"We may now consider the claims of Switzerland as a whole to more sunshine in winter than the British Isles.

"(1) The more southern latitude allows it to have a longer period of sunshine, even on the shortest day, and (2) its continental situation gives a drier atmosphere, thereby allowing greater penetration of the sun's rays. But Switzerland has a still greater claim as a health resort in winter than most other lands in the same latitude, and this comes from so much of the land being mountainous. Places can be found at such an elevation where no fog collects during cold weather to obscure the much-needed sunshine. In such places the fresh, invigorating air stimulates the metabolism, while the bright, sunny landscape cheers the mind and helps the recovery of the body.

"I have so far been referring to the advantages of winter in Switzerland. Many, however, must have felt the invigorating effects and mental stimulus of a holiday during summer in the Alps. This effect is produced to a much greater extent on a tuberculous patient with lowered vitality, and when a suitable locality can be found, easily reached, and comfortable to live at, it is right to give the invalid the better prospect for his recovery.

"So far we have considered the effect of climate alone on tuberculous cases, but the environment must also have a powerful influence on their recovery. There are no doubt many persons to whom surroundings are of little importance; they are insensitive to what may be called the æsthetic influence of the environment. But, on the other hand, there are also many whose life is much affected by these influences, and to them a beautiful country to live in is of much importance. In such persons any depression of the vitality by illness increases very much the mental effects of their surroundings, and it is to these that the lofty mountains, glittering with snow, softly shaded pine slopes, and myriad-tinted meadows specially appeal. It cannot be a useless thing in treating invalids who are sensitive to environment to place them amongst the most beautiful surroundings available, and there are few countries so easily reached from England where so many natural attractions can be found as Switzerland, especially amongst the higher Alpine resorts."

Communication II. (written by A. B., a patient with extensive pulmonary tuberculosis of some standing).—"There is no subject which arouses deeper interest to-day than the influence which our mind exercises upon our bodily health. It is generally recognized now that it is through unhappiness, worry, and despondency that the evil microbes of disease find an entry into the body, and the restoration of the mind is regarded as a preliminary step to their elimination.

"In this respect the environment of the patient has become a matter of primary consideration. We are not isolated units; we live in the midst of a universe of visible and invisible beings, and, although we are only upon the threshold of a knowledge of the subconscious contact of mind with mind, we are all aware of the influence which our environment exercises upon us mentally and physically.

"There are some people who seem to be endowed with a special gift for bestowing health and happiness—or, at least, serenity of mind—upon those with whom they come in contact, and, on the other hand, a person of gloomy or morose disposition will act as a depressing influence upon a whole household. In some houses where tragic lives have been passed we can feel a peculiar atmosphere of depression, and in a wicked neighbourhood a haunting sense of invisible evil presences all around us.

"If we desire to restore the mind of the patient to happiness, hope, and faith, we must remove all bad and depressing human influences, and surround him with those who can impart to him their own sounder mental outlook.

"Beyond, however, our human environment, there is another enormous aid to the recovery of mental as well as of physical health.

"It is not everyone to whom the mountains can deliver their healing message, but if an artificial city life has not entirely robbed us of our birthright, they hold a restorative force for mind as well as body that we cannot over-estimate.

"In those sun-lit Alpine regions which seem to have been provided by Nature as a hospital and refuge for the sick and suffering from all parts of Europe, it is far more than the pure air and brilliant sunshine which banishes disease and restores the sufferer to life and health.

"Slowly at first, but surely, amidst those serene mountain heights, lifted above the toil and strife of earth, the spirit of Nature works upon our spirits until we catch a glimpse of this beautiful earth as she came from the hand of the Creator, and we know that His will is not suffering and disease, but happiness and health for all His creatures. In that Divine vision we regain contact with the source of our life and being, and as that mighty force flows into us, the evil microbes of suffering and disease flee away."

Communication III. (provided by C. D., a lady who has been almost entirely confined to bed for the past three years).—"Provided one has an imagination, one need never tire of life at this altitude. Being surrounded by the mountains, to be constantly gazing at their lovely snow-tipped peaks, the wonderful sunsets and after-glows, and the colourings of the slopes leading down to hidden valleys—these fill one's mind with the largeness and majesty of Nature, and help one to rise above the petty and mundane things of life; in other words, to 'get on the top' of one's aches and pains and the weariness of this complaint. In winter, or even in summer, when the air is so clear and invigorating, one feels the *joie de vivre;* on other days the air is soft and restful, and soothes one's tired nerves. For who does not at times get irritable? To be able to live and cure amongst such lovely surroundings is a privilege, and compensates largely for the many handicaps of being away from one's home and people."

Communication IV. (provided by E. F., a patient who has been kept very quiet, generally in bed, for a year).—"I wonder if people realize quite what it means to an invalid to pass through the long months of illness in happy and beautiful surroundings? This has been my experience for the past two years or more. A bad night is almost forgotten when you can watch from your bed the sunrise glow touching peak after peak of the far-stretching mountain ranges. The hours

pass with astonishing quickness if you can only lie out on your balcony in the glorious sunshine of an Alpine winter, and look on at the gay parties of 'skiers' and 'lugers' tumbling so merrily about on the snowy slopes. Then, in spring, with opera glasses you can pick up the first crocuses pushing up through the grass between the dwindling patches of snow, and, as the ground clears, friends bring you each day fresh Alpine treasures—gentians, snow-bells, anemones. And so it comes to pass between the open-air life on your balcony and the happy activities which surround you, you forget that you are a 'bed patient,' and become so sunburnt and gay that your friends and relations, when they come up into the mountains to visit you, are almost tempted to call you a fraud."

An Ideal Alpine Resort—Montana.[1]

Among Swiss health stations specially devoted to the treatment and residence of tuberculous cases, Montana deserves a foremost place.

THE ENGLISH SANATORIUM AT MONTANA.

The Palace Hotel Sanatorium has private rooms and open-air galleries providing accommodation for 110 patients.

Montana is situated in the Upper Valais at an altitude of 4,920 feet on the slopes of the Rhone Valley. It occupies an almost unique

[1] The Editor of this journal must alone be held responsible for this section. It is based on observations made during a visit this summer.

MONTANA AND VALLEY OF THE RHONE.

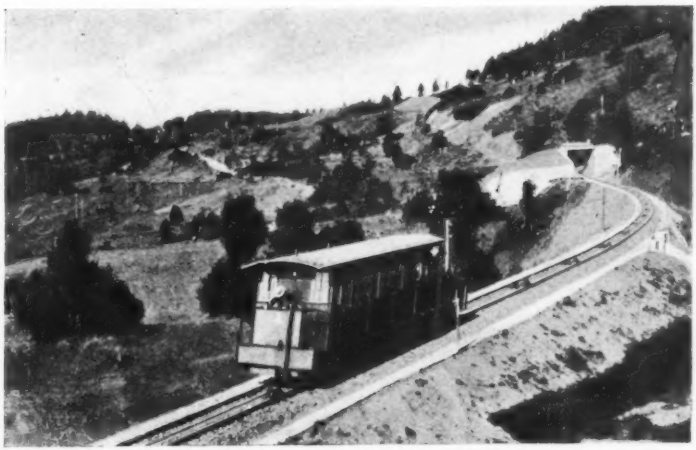
The photograph is taken from the plateau of Montana looking eastwards towards the pass of the Simplon. On the left is the Palace Sanatorium.

MONTANA IN WINTER.

In the foreground are châlets. The Palace Sanatorium is shown on the right. The background is formed by various mountains of Valais.

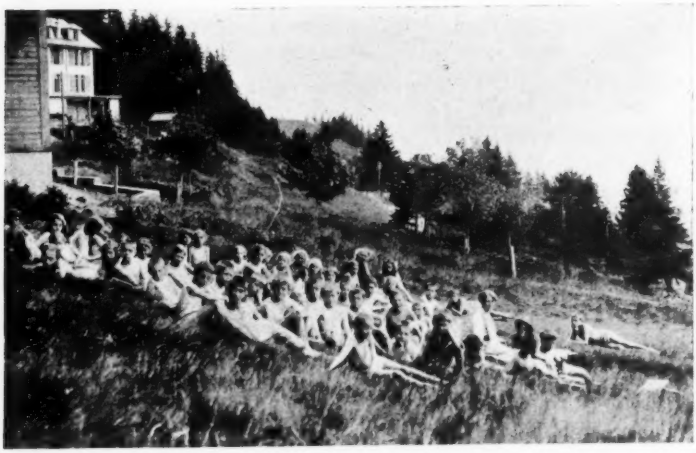
SKIING ON THE WILDSTRUBEL.

A group of five enthusiasts on ski at the summit of the Wildstrubel above Montana.



THE MONTANA-VERMALA FUNICULAR RAILWAY.

The line extends from Sierre, in the Rhone Valley, to Montana.



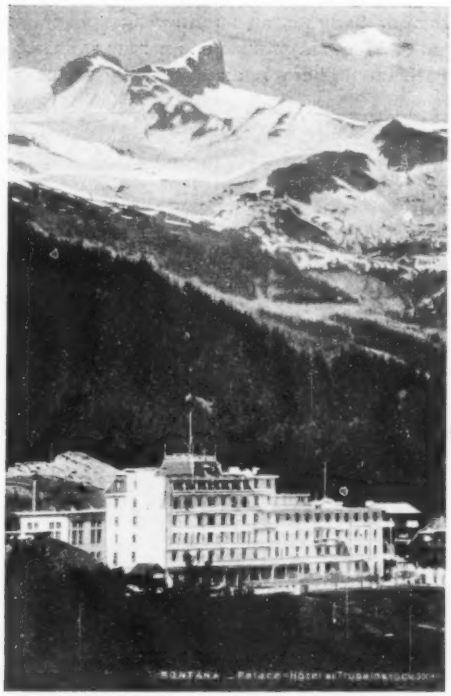
SUN TREATMENT AT MONTANA.

A class of Belgian children at "school" in the sun and fresh air. A corner of the Belgian Sanatorium is shown at the left of the picture.

A LAKE AT MONTANA.

On the Montana plateau are a series of lakes of which one, Lac du Golf, is shown in the photograph. In the background, on the other side of the Rhone Valley, are some of the Mountains of Valais.

position, and one peculiarly fitted to meet the requirements of invalids, and particularly tuberculous patients undergoing sanatorium treatment. Montana is placed on a plateau of wonderful meadows, rich in every variety of wild Alpine flowers, and beautiful forests. It looks out on a panorama extending from Brigue to Martigny, with glorious views of the snow-clad mountains of the canton of Valais, reaching from the



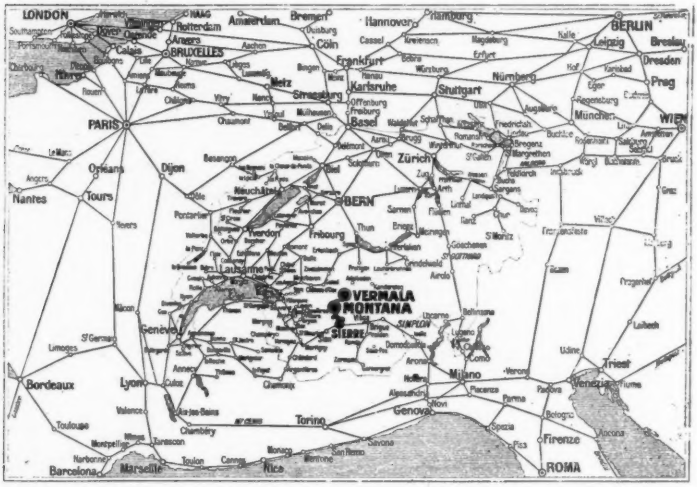
THE PALACE SANATORIUM, MONTANA.

The sanatorium is situated above the funicular railway at Montana with the Wildstrubel and other mountains behind. The illustration shows the snow-covered Trübelstock.

Simplon to Mont Blanc. Among the peaks opposite Montana are the Weisshorn, the Zinal Rothorn, the Gabelhorn, and the Matterhorn. The plateau of Montana covers a considerable area, and extends along the mountain sides for some 5 kilometres. It lies open to the south, and there are no near mountains to obstruct the outlook or limit the exposure to the sun. Montana has the highest record for sunshine of any Swiss health resort. Even in winter there are frequently seven

hours of sunshine, and the temperature, on an average, is higher than that of most other places in Switzerland. Although so open to the south, it is sheltered from north winds by the massives of the Wildstrübel and the adjacent chain of mountains. There are no glaciers near to Montana, and the temperature and climate generally are considered to be milder than at such well-known centres as Leysin, Arosa, and Davos. Fogs are practically unknown. The rainfall is much lower than in many places, and the atmosphere is very dry.

The plateau of Montana provides numerous walks of easy gradients suitable for patients. There is an excellent golf course of eighteen



MAP INDICATING POSITION OF MONTANA.

The map shows position of Montana above Sierre in the Rhone Valley, and indicates various railway lines by which it can be reached from all parts.

holes. A number of picturesque lakes add greatly to the beauty of the district. For those capable of undertaking long walks or engaging in mountain climbing there is an extensive range of excursions. Montana is an all-the-year-round resort. In winter, every form of winter sport can be provided.

Montana can be readily reached from all parts of Europe, and patients from England can undertake the journey with comparative ease. A through carriage is now provided from Calais in the Orient Express via Vallorbes, Lausanne, Montreux, and the Rhone Valley as far as Sierre, from whence Montana can be reached by funicular. The whole journey from London to Montana takes not more than twenty-four hours.

There are various health stations in Switzerland to which English tuberculous patients are often sent.[1] Among them, in addition to Montana, may be mentioned Leysin above Aigle in the Rhone Valley, where Dr. Rollier's justly celebrated cliniques for cases of surgical tuberculosis are situated. Davos and Arosa in Eastern Switzerland have also been frequented in pre-war days by many English health seekers.

In this article attention has been more particularly directed to the advantages offered by residence at Montana, not only because we are acquainted with present conditions there, but also because we believe that, on account of its geographical position, climatic conditions, and conveniences for residence and sanatorium treatment, it is destined to become one of the chief of the Swiss health stations for tuberculous cases, and particularly for English patients.

At Montana there are a number of sanatoria. Tuberculous subjects can also be cared for in pensions and flats, and a number of persons have built their own châlets.[2]

General Conclusions.

We have endeavoured to show in this paper that great benefit is to be derived in certain cases from a period of residence in the thin, pure, dry, and invigorating air of the Swiss Alps; and we have endeavoured to discriminate between those cases which are suitable and those which should not be sent to high altitudes. We have referred more especially to cases which come mostly under our observation—that is to say, patients suffering from tuberculosis of the lungs. It is necessary to emphasize once more that early diagnosis and prompt measures in regard to treatment are the main factors if a cure is to be expected in this disease. We have no hesitation in saying that early and suitable cases, when sent straight to the Alpine climate and kept there for a

[1] Full particulars regarding the various health stations of Switzerland specially suitable for English cases may be obtained on application to the British offices of the Swiss Federal Railways, Carlton House, 11B, Regent Street, London, S.W. 1.

[2] A list of hotels, sanatoria, pensions, châlets, and apartments can be obtained on application to the Bureau Official de Renseignments de Montana-Vermala. The chief centre for English patients is provided by the Palace Hotel Sanatorium. Particulars regarding the Palace Hotel Sanatorium and all necessary arrangements for travel thereto and residence can be obtained on application to the Manager, Palace Hotel Sanatorium, Montana. The Palace Hotel Sanatorium at Montana is open all the year round, and both medical and surgical cases of tuberculosis are received. The Medical Superintendent is Dr. Bernard Hudson, who is himself a cured tuberculous subject, and before the war was in practice at Davos, where he acted as His Majesty's Consul. Dr. Hudson, who is assisted by resident medical officers, holds the Swiss Federal Diploma, which enables him to act as medical adviser to English and other patients in all parts of Switzerland. The sanatorium possesses a full staff of English trained nursing sisters, who act under the direction of the Matron, Miss H M. Barry, R.R.C. There is also a resident radiographer, Mr. Percy G. Sutton, M.S.R. It seems desirable that these data should be presented for the information of medical advisers; further details may be obtained on application to the Medical Superintendent.—EDITOR *British Journal of Tuberculosis.*

long enough period, almost invariably make extraordinarily quick and stable recoveries. An average sojourn should not be merely for three months or so; it should certainly be for not less than six months, and, better still, it is wise to devote one year, or even two, with periods of change of environment, when necessary, to securing arrest of the trouble.

It is a regrettable fact that early cases of tuberculosis not infrequently are told that they are not ill enough to go to Switzerland, and advised to do this or that, instead of starting a systematic sanatorium régime in the Alps; it is just during this early period, before a patient becomes really ill, that treatment holds out the best prospect of success.

Here in the Alps a large number of second and third stage patients who have tried to get well without success elsewhere receive great benefit. Too frequently cases are sent out in the very last stages of tuberculous disease, as a kind of last and final hope, when the situation has really become utterly hopeless. This practice is criminal and cruel. Reference may be made to one case sent out to Montana last winter, a poor lady who arrived on a Saturday and died on the Sunday morning. Other advanced cases have lasted but a few weeks. It is not saying too much to declare that it is a wicked thing to send dying patients away from their homes and their friends at the end of their lives.

A patient with tuberculous disease, directly the trouble has been definitely diagnosed, should be quickly and honestly informed what he or she is up against, and what are likely to be the results of neglect of proper care. Even at the present day many patients are sent out to Montana, suffering from tuberculosis of the lungs, who have not been aware what was really the matter with them. It is impossible for such a person to co-operate properly in following out a course of treatment if he does not know the necessity and reasons for it, or the results that may follow from the neglect of effective management.

If we have been able to point out to members of the medical profession the value of the Alpine climate, particularly in the treatment of tuberculosis, and the class of case most suitable for residence in the mountain regions of Switzerland, we shall feel that our labour in preparing this paper has not been in vain.

LEYSIN REVISITED.

By C. W. SALEEBY,
M.D., F.R.S.E.,
Author of "The Eugenic Prospect," etc.

Last year, acting on the advice of the editor of this journal and of Dr. Ceresole of Lausanne, and in the company of the latter, I visited the cliniques of Dr. A. Rollier at Leysin, and made the acquaintance of the great pioneer of heliotherapy. The evidence there patent for all to see sufficed as argument for the creation of a Committee on Light in our

LEYSIN: "LES CHAMOIS."

This Rollier Clinic is situated at an altitude of 4,530 feet. It is a clinic taking men, women and children, and has eighty beds. In addition to the galleries shown in the illustration there is a solarium at the western end.

own country, and after six months' reiteration that body was appointed by the Medical Research Council. Now, at the request of the editor, it is my privilege to write a few notes after a week spent at Leysin during August of this summer, and whilst Dr. Rollier and his colleagues held their third course of post-graduate lectures and demonstrations.

Some sixty doctors were present from all parts of the world, including places as far apart as Philadelphia and Madras. To one who is no clinician it was, of course, extremely valuable and important to hear their comments upon the results obtained in tuberculosis (often with pulmonary and often with secondary infections) by means of sunlight. I knew, of course, that the results I had seen incomparably

surpassed those of the surgical methods at the end of the last century, but now I know that, except by sunlight, no such results are anywhere achieved to-day—a fact of the first importance.

Last year I missed the School in the Sun,[1] which was the delight of all observers near the end of a wonderful week this year. This institution is twelve years old, and rears in health and joy many "delicate" children whose lives are constantly imperilled when they attempt to live in the cities of our time without their due share of the

LEYSIN: "LE CHALET."

This clinic was the first to be opened by Dr. Rollier. It was in this simple chalet that Dr. Rollier succeeded in securing his first cures by heliotherapy. It is a mixed clinic with fifty beds.

sunlight. We sat and saw the school in action, and rejoiced at the results in terms of body and mind, as shown by the brown-skinned, bathing-costumed group of boys and girls between four and twelve years old, who demonstrated to us how heliotherapy leads on to the chief need of our urban lives, which is heliohygiene.

For this demonstration, above all, I thank Dr. Rollier. It illus-

[1] Dr. Rollier has published a descriptive and illustrated article on his School in the Sun, under the title of "A Plea for More Sunlight," in the February number of *The Child*. See also Dr. Saleeby's article on "Back to the Light: A Note on the Rediscovery of the Sun in Hygiene and Medicine," in *The Child* for September, 1922 (vol. xii., No. 12).—EDITOR, *B.J.T.*

trates my oft-repeated assertion that I praise his work *in order to end it*, and to leave him with no work to do but write his memoirs.

Some years ago I ventured to introduce the term "diseases of darkness" to indicate rickets, tuberculosis, and various other diseases which are preventable and curable by sunlight. As regards rickets, the truth is now known to all the world. It is, as Dr. Rollier says, translating my phrase, the "maladie de l'ombre par excellence." It offers little interest to him, however, as he has remarked to me, because it is "too easy." In his great work, "La Cure de Soleil,"[1] which has been so deplorably ignored in this country, but which, I hope, together

LEYSIN: "LES FRÊNES."

This is the chief of Dr. Rollier's clinics, and here are the headquarters of the series of clinics. It possesses large galleries and terraces and a model solarium. There are special rooms for X-ray examinations, plaster-work, etc. For the patients there is a lift for the conveyance of beds, also a library, a concert hall, etc. "Les Frênes" is a mixed clinic with ninety beds.

with "L'Ecole au Soleil" and "Comment lutter contre la Tuberculose?" will shortly appear in English (we have translations ready), Rollier published photographs of the cure of rickets by sunlight, but we took no notice of them. If ever one more case of this disease occurs in our country we are disgraced.

[1] "La Cure de Soleil" was published in 1914 at Lausanne by Payot et Cie. Price 20 francs (Swiss).

As for tuberculosis, it was deeply to be regretted that no senior man, and not even one medical officer of health, from our country attended this magnificent demonstration. The work of Rollier has now proceeded for nineteen years on an immense scale. The sun cure of tuberculosis is recognized and practised with success also in France, Italy, and the United States, and by Sir Henry Gauvain at Alton, Dr. Gordon Pugh at Carshalton, Dr. Martin at Leasowe, and one or two others in our own country: yet in the present year, in the *Manchester Guardian*, Dr. F. E. Wynne, Medical Officer of Health for Sheffield, and Professor of Public Health in its University, writes that no one who has the true interests of our tuberculous population at heart can fail to regret my suggestion that sunlight can cure tuberculosis. Meanwhile "surgical" tuberculosis, deplorably so called, is alone costing some ten thousand lives per annum in England and Wales; whilst in two days from London anyone who wishes to learn can see the sunlight curing hundreds of cases of tuberculosis for himself.

The question arises whether we should not do better to establish solaria in Switzerland for ourselves, and send our children there to be cured in a few months or a year or two rather than, as now, let them live in darkness in our own institutions for six or eight years until they die. The dictates of economy and humanity would seem to be clear.

Best of all would be the restoration of sunlight to our malurbanized millions by the abolition of the coal smoke which distinguishes and disgraces our cities among those of all the earth, and by a fundamental remaking of our urban homes and workplaces, ways, and lives.

If any reader now thinks me wild and untrustworthy in writing thus, he has not visited Leysin. When he has done so, he will think as I do: nothing else is possible. We must learn or perish. The darkness of our ways and practice, the fact that we scarcely know the word "solarium," though the sanatorium which is not a solarium is a tragic misnomer—these indicate that we do not know what are the first laws of life, and are the outward sign of the only real darkness, which is ignorance, as Shakespeare said.

AN IMPRESSION OF THE WORK OF THE SECTION OF TUBERCULOSIS AT THE GLASGOW MEETING OF THE BRITISH MEDICAL ASSOCIATION.

By A. S. M. MACGREGOR,
O.B.E., M.D., D.P.H.,

Joint Secretary of the Tuberculosis Section of the British Medical Association, Glasgow Meeting, 1922; Assistant Medical Officer, Public Health Department of the City of Glasgow.

The Section of Tuberculosis in connection with the British Medical Association's Ninetieth Annual Meeting at Glasgow met on Thursday, July 26, under the Presidency of Professor Sir Robert Philip, M.D., LL.D., P.R.C.P. (Edin.). This was the first time that a Tuberculosis Section had been held in connection with the Annual Meeting of the Association, and the President, in his opening address, referred to this fact, and traced the progress which had been made in dealing with tuberculous disease since the last meeting of the Association in 1888. He traced the decline in the incidence of the disease, which had been greater in Scotland than in England, since that date, and described the lines on which anti-tuberculosis measures had developed.

The feature of the meeting was the opening paper by Dr. E. Rist (of Paris) on "The Clinical Differentiation of Fulmonary Tuberculosis from Other Respiratory Affections." Dr. Rist's paper was a most interesting one, and amounted to a plea for greater accuracy in differential diagnosis, and the necessity for careful investigation of doubtful cases. It was the lecturer's opinion that there was still a tendency to over-diagnosis of pulmonary tuberculosis. Dr. Rist gave figures from his own experience and that of others showing that the proportion of errors in the routine diagnosis of the disease is apt to be very large, and he reminded his hearers how the experiences of the War convinced the majority that there was something wrong in our every-day methods of discriminating tuberculosis from other respiratory diseases. Summarizing his remarks under four heads, Dr. Rist dealt with: 1. *The Skin Reaction*, which merely detected the initial steps of infection, and was not a diagnostic sign of tuberculous disease. 2. *X Rays as an Aid to Diagnosis.*—Great stress was laid upon the value of radiological examinations as an aid to accurate diagnosis, and it was shown that, in fact, many cases cannot be accurately diagnosed without reference to X-ray findings. 3. *Examination of Sputum.*—Modern methods of detecting bacilli in the sputum have been improved. A complete examination of a supposed tuberculous patient implies repeated and conscientious

sputum examination. 4. *Infections of the Upper Respiratory Passages.*—Infections, catarrhs, and mechanical obstructions of the upper respiratory passages give rise to symptoms liable to be mistaken for tuberculosis; they may influence the bronchial tree and even the tissue of the lung. Dr. Rist then dealt with the diseases mistaken for pulmonary tuberculosis, in regard to which reference should be made to the paper itself for details. His main attitude towards diagnosis may be summed up as follows in his own words: "The first step after analyzing the symptoms is to look for positive signs of a localized lung lesion. And here begins properly the task of the physician. Percussion, auscultation, and the other methods of physical examination, must be applied without any bias. I mean that the physician should not, at this step, ask himself the question: Has this patient tuberculosis? but simply: Is there, either in the lung or elsewhere, a localized lesion which may account for the symptoms observed? I need not emphasize again the value of an X-ray examination of the chest to show whether such a lesion can be demonstrated or not. If it cannot be demonstrated in the lung, then let us look for it in some other part of the body. And here, after due consideration of the cardio-vascular and other systems, comes in the careful examination of the upper air passages by an expert. It will often, I dare say, prove fruitful of a correct diagnosis." As regards the finding of tubercle bacilli in the expectoration, Dr. Rist emphasized the necessity for repeated examinations, and stated that, in his opinion, one positive result may mean very little. The following took part in the discussion: Professor S. Lyle Cummins, Dr. Marcus Paterson, Dr. James Crocket, Dr. A. Hope Gosse, Dr. Fergus Hewat, Dr. Ian Struthers Stewart, Dr. Muthu, Dr. Prest, and Dr. Gillies of Australia. All the speakers indicated their high appreciation of Dr. Rist's paper, and Dr. Gosse took the opportunity of making an important communication of an investigation carried out by himself and Dr. Lisle Punch on complement fixation as a test for activity in a tuberculous lesion. The results quoted by the speaker were very striking, and are in course of publication.

A paper on "Some Aspects of the Treatment of Non-pulmonary Tuberculosis" was read by Dr. James Taylor, Visiting Surgeon to the Tuberculosis Hospital of Glasgow Corporation at Robroyston, where there is accommodation for about 300 patients of this type. The general treatment is based on that of Dr. Rollier, as practised at Leysin, with modifications appropriate to differences in climate. The speaker considered that rapidity of cure depended very greatly on climate (*i.e.*, insolation), and he was unable to get the phenomenal results obtained by Dr. Rollier, which enabled more conservative methods to be adopted. While the treatment of surgical tuberculosis must be essentially conservative in hospitals where one has not the most

favourable climatic conditions, operative treatment combined with general treatment will give the most speedy, though perhaps slightly less perfect, results. Some results of specific treatment of cold abscesses and sinuses were given. It was difficult to prevent sinus formation, especially during the winter months. Cold abscesses were treated by repeated aspiration with a measure of success. Some who did not respond to this were treated by open operation, with careful surgical technique, and the wound sutured. This was successful in one-third of the cases. The use of modifying fluids has given the best results in cold abscesses. Calot's Fluid No. 1 gives the best results, though sometimes naphthol-camphor was used successfully. The treatment of sinuses is a difficult problem, a large proportion of cases having these on admission. For afebrile cases Calot's paste was useful, with striking results in some cases. Dr. Taylor referred to the good results of deep X-ray therapy in massive cervical glands, as carried out by Dr. Henderson, Radiologist to the Hospital. Reference was made to the necessity for extreme care in applying antisyphilitic treatment to patients with a positive Wassermann reaction and a definite tuberculous lesion, as the latter is apt to become activated after an anti-syphilitic injection.

A special feature of the Section was the largely attended lecture and cinematograph demonstration given by Dr. Rollier of Leysin, on the "Rôle of the Sun in the Treatment of Tuberculosis," in which the lecturer gave a very full demonstration of his well-known methods. The lecture was profusely illustrated by lantern slides and cinematograph films.

Another interesting feature of the Section was the exhibit of X-ray films by Dr. Henderson, Radiologist to the Public Health Department, Glasgow, which comprised about 100 films of different lesions of the chest, with special reference to those liable to be mistaken for pulmonary tuberculosis and those presenting difficulties in interpretation. As an aid to their study a brief clinical description was given of each case.

ASSOCIATIONS AND INSTITUTIONS.

THE TUBERCULOSIS SOCIETY OF SCOTLAND.

THIS Society was initiated over a year ago to meet the needs of those engaged in tuberculosis work in Scotland, and also to assist others who, though not exclusively or directly engaged in such work, are desirous of keeping in touch with what is being done in connection with the study of tuberculosis. The object of the Society is to foster the study of tuberculosis in every direction—clinical, pathological, administrative, sanatorium work, and to encourage original work in research of every kind. In order to distribute the interest as widely as possible the meetings are held alternately in Edinburgh and in one of the larger provincial towns, and it is intended to hold some six meetings in the year. The discussions are varied as far as possible, so as to deal with the different aspects of the subject which make their appeal to a membership comprising workers in every field of the tuberculosis problem.

A joint meeting was held along with the Edinburgh Medico-Chirurgical Society in June to hear Professor Calmette's paper on "The Protection of Mankind against Tuberculosis," while many of the members attended the discussion on "Differential Diagnosis of Tuberculosis," introduced by Professor Rist in the Tuberculosis Section of the recent B.M.A. Conference in Glasgow. The programme for the October meeting, which is to be held at Aberdeen, includes a paper on the results of an investigation into the frequency of syphilis in sanatoria, either associated with tuberculosis or mistaken for it, and dealing with the differential diagnosis of the two conditions, by Dr. Munro, of Glenlomond Sanatorium; one by Dr. Alex. Mitchell, of Aberdeen, on "Treatment of Bone and Joint Tuberculosis in Children"; another on "The Newer Methods employed in Diagnosis of Renal Tuberculosis"; while Dr. Johnstone, of Tor-na-dee Sanatorium, is to deal with "The Scope of the Sanatorium in the Treatment of Tuberculosis." The Society is fortunate in having as its President Sir Robert Philip, who was one of the prime movers in its creation, while among the Vice-Presidents and Members of Council are many leading medical men representative of different parts of Scotland. The Hon. Secretaries are Dr. W. Leslie Lyall and Dr. Ian Struthers Stewart, from whom further particulars can be obtained, and to whom application should be made for membership.

NOTICES OF BOOKS.

EXTRAPLEURAL THORACOPLASTY IN PULMONARY TUBERCULOSIS.

ALTHOUGH the treatment of pulmonary tuberculosis by thoracoplasty has been practised for many years, there has been a lack of accessible information about its technique and results. Madinier of Lyons has now issued a monograph which provides not only such information, but also furnishes a careful discussion, which will appeal to the sanatorium physician who is seeking guidance in his estimation of the suitability of cases for treatment.[1] An historical chapter recounts the stages passed on the way to a more and more complete mobilization of the parietes as being the operation of choice, and a collapse and immobilization of the lung more extreme than that provided by an ideal artificial pneumothorax. The contrast and comparison with this latter treatment is gone into in detail, and the important point noted that the practical abolition of movement of a lung collapsed by extrapleural thoracoplasty produces conditions in which there is a somewhat greater risk of infective material being passed to the other side, and so setting up a cross infection. The liability is said to be all the greater just after the operation, when trauma has led to an inhibition of coughing. This risk, the severity of the operation, its irrevocability, and its æsthetic disabilities, are to be balanced against its theoretical satisfactoriness; it is not lost sight of that extrapleural thoracoplasty is an heroic procedure whose indications are pretty definite, and not one which should take the place of artificial pneumothorax. Madinier would never consider it until that had failed, nor until the ordinary medical treatment had been found ineffective after a thorough trial. But if strictly unilateral cases were to be chosen exclusively, extrapleural thoracoplasty would be a rare operation indeed, and the difficult question of how much mischief may safely be tolerated in the less diseased lung is interestingly discussed. Madinier inclines to the view that, while a clinical integrity is usually the best that can be expected, a little dulness may be discounted so long as active signs are repeatedly found absent. He disagrees, therefore, with those who state that even gross lesions of the relatively sound lung may improve as a result of collapse of the worse lung. Madinier counsels a greater prudence in the selection of cases. He considers also that complete success is most likely when nature has already shown the way by commencing a spontaneous retraction of the chest wall. Of the various operations devised—and here well described—the author expresses a preference for one following the technique of Sauerbrück and of Saugman, and his experience leads him to stress the importance of carrying out the operation in stages at intervals; of employing regional as opposed to

[1] "La Thoracoplastie Extrapleurale dans le Traitement de la Tuberculose Pulmonaire." By J. Madinier, Interne des Hôpitaux de Lyon, ex-Médecin Assistant au Sanatorium d'Hauteville. Pp. vii + 110. Paris: Masson et Cie. 1922. Price 12 fr.

general anæsthesia; of adopting the sitting posture if possible; of a methodical procedure, having regard to hæmostasis and the avoidance of damage to periosteum and muscle; and of the need for section and, better still, of partial resection of the first rib, if a good apical collapse is to be obtained. Stress is also laid on the advantages of operating at the sanatorium rather than transferring the patient to and from a surgical hospital. The study is a well-balanced one, for it gives not only Madinier's experience, but also, and with criticism, that of other workers in the same field. There is a Preface by Dumarest and a Bibliography, in which the paucity of British references is notable.

R. G. BANNERMAN, M.A., M.D.

ARTIFICIAL PNEUMOTHORAX.

The Medical Research Council have rendered tuberculosis officers and medical advisers generally a notable service by the issue of a Report on Artificial Pneumothorax, prepared by Drs. L. S. T. Burrell and A. Salusbury Macnalty.[1] It provides in convenient form the chief data now available regarding the means and advantages of treating disease of the lung by the production of controllable periods of rest from respiratory movement. The authors have collected expressions of opinion and results of experience from various experts, and particulars are given regarding appliances suitable for inducing artificial pneumothorax, the selection of cases, technique, and dangers and complications of the operation; in fact, all aspects of the subject receive full consideration. The authors show that it is impossible to enumerate indications and contra-indications, since every case must be considered on its own merits, but, speaking generally, they suggest that the following cases can be considered suitable for the production of artificial pneumothorax: (1) Any patient with a tuberculous lesion of one lung, who has signs of activity after six months' medical treatment. (2) Patients with tuberculous disease in both lungs, but with less than one-third of the better lung involved. (3) Recurrent or repeated hæmoptysis as a result of tuberculosis or other disease of the lung. (4) Bronchiectasis if there are toxic symptoms, with copious or offensive sputum. I should not advise pneumothorax in a chronic case of bronchiectasis if there were no systemic symptoms and little sputum. (5) Abscess of lung. (6) Pleural effusion. This may well be treated by replacing the liquid withdrawn with oxygen. (7) To stop pain in acute dry pleurisy. On the other hand, they enumerate the following as contra-indications: (1) Disease of one-third or more of the better lung. (2) Extensive tuberculous disease elsewhere, such as tuberculous enteritis. Tuberculous laryngitis is no contra-indication, and is usually improved by treatment. (3) When the pulmonary tuberculosis is a terminal infection or intercurrent with some general disease, such as diabetes, cirrhosis of the liver, chronic nephritis, etc. (4) Patients with a highly neurotic temperament do badly. (5) Ill-nourished patients, patients with chronic dyspepsia, or severe visceroptosis.

[1] Privy Council Medical Research Council Report on Artificial Pneumothorax. By L. S. T. Burrell, M.A., M.D., M.R.C.P., Physician to the Brompton Hospital for Consumption and Diseases of the Chest, and A. Salusbury Macnalty, M.A., M.D., of the Ministry of Health. Pp. 104, with 17 plates, 2 charts, and 3 figs. London: His Majesty's Stationery Office, Imperial House, Kingsway, W.C. 2. 1922. Price 2s. 6d. net.

(6) Asthma and emphysema are not always absolute contra-indications, but pneumothorax should be performed in such cases only if there are special or urgent indications. (7) Patients with good resistance in the early stages of pulmonary tuberculosis should first be treated by ordinary medical methods. The authors are very emphatic that each case must be considered individually, and that there is no golden rule as to the selection of cases. The reports of cases and replies to the questionnaire which was circulated are particularly informing. There is a useful Bibliography.

PULMONARY TUBERCULOSIS.

Professor Fishberg's elaborate treatise on tuberculosis of the lungs has now been issued in a revised and enlarged third edition.[1] The fact that the previous issues have been exhausted within five years affords abundant testimony to the high favour which has been justly won by this comprehensive, well arranged, lucid, and eminently serviceable work. It is a volume which will not only be of exceptional interest to the specialist, but of great help to the general practitioner. The author, in more than a score of years' study of tuberculosis problems in New York, has been enabled to arrive at the following conclusions: "(1) The physician can, and should, do more than recognize phthisis in its earliest or pre-tuberculous stage, and at once consign the patient to a sanatorium. (2) That 'incipient' does not always mean *curable* tuberculosis, and, conversely, that 'advanced' disease does not necessarily indicate a hopeless outlook. (3) That institutional treatment is not the only effective method of handling the phthisical patient. (4) If all tuberculous persons in this country would consent to hospitalization, the available institutions would hardly accommodate 10 per cent. of eligible patients. (5) Even those treated in sanatoria must be cared for by their family physicians before admission and after discharge. (6) Careful home treatment is productive of practically the same immediate and ultimate results as institutional treatment, and is less costly to the patient and to the community." These points certainly deserve unprejudiced consideration by British advisers. Dr. Fishberg shows that "there is hardly a person living in a large city who has escaped infection with tubercle bacilli," but that "not everyone infected with tubercle bacilli is destined to become sick," and he therefore rightly urges that a sharp distinction must be made between infection and disease, tuberculosis and phthisis. Further, while admitting the immense utility of sanatorium treatment, he enumerates its limitations, and claims that "institutional treatment is not the only, nor the best, available method of caring for the majority of patients. Experience has taught that we can properly house and feed a patient in the city at a much less expense than in a sanatorium." The work is a very complete one, and will prove invaluable alike to pathologist, diagnostician, and practical doctor. The new edition contains two important new

[1] "Pulmonary Tuberculosis." By Maurice Fishberg, M.D., Clinical Professor of Medicine, University and Bellevue Hospital Medical College; Chief of the Tuberculosis Service, Montefiore Hospital for Chronic Diseases, and of Bedford Hill Sanatorium for Incipient Tuberculosis. Third edition, revised and enlarged. Pp. 691, with 28 plates and 129 charts and figs. London: Henry Kimpton, 263, High Holborn, W.C. 1922. Price 42s. net.

chapters, dealing respectively with Reciprocal Relations between Pulmonary Tuberculosis and Certain Physiological and Pathological Processes, and Medico-legal and Insurance Aspects of Tuberculosis. Each of these is a particularly enlightening and valuable contribution, and indicates the wide vision and far-reaching powers of the author. The work is the most up-to-date, complete, stimulating, and generally useful of modern treatises devoted to a study of pulmonary tuberculosis. It should be in the hands of every tuberculosis officer and all others responsible in any way for the recognition and care of consumptive cases. The volume is admirably got up and is effectively illustrated. References appear on almost every page. The indexes are particularly good.

MANUALS FOR MEDICAL ADVISERS AND WORKS OF REFERENCE.

In the last issue of this journal attention was directed to the appearance of Vol. VII. of the second edition of "Encyclopædia Medica."[1] This monumental work, in spite of almost insuperable difficulties, is being carried through with conspicuous courage and tireless industry by its editor, Dr. J. W. Ballantyne, ably seconded by the really scientific spirit of the publishers, Messrs. W. Green and Son. Vol. VIII. has recently appeared, and contains a Foreword which reveals something of the obstacles and anxieties with which the editor and the publishers have had to contend, but indicating also that the four remaining volumes will appear at regular intervals of six months. Vol. VIII. is of special interest and value to tuberculosis officers and other medical advisers having to deal with tuberculous subjects. There is an authoritative article on Tuberculosis of the Lungs by Sir Robert Philip and Dr. Andrew Fergus Hewat. Dr. Hewat also deals with Tuberculosis of the Larynx. Sections dealing with other diseases of the lungs are contributed by Sir Robert Philip, Dr. A. F. Hewat, Dr. S. H. Habershon, Dr. R. A. Fleming, and Mr. F. E. Jardine. There are several excellent articles on examination of, and lesions of, the larynx. Reference may also be made here to Dr. W. Elder's contribution on Life Insurance, Professor Sir John Macpherson's exposition of Essentials relating to Lunacy, and Dr. T. D. Patmore's description of Malingering. In the section on Diseases of the Mammary Glands, by Sir Harold J. Stiles and Mr. D. M. Greig, there is a good account of tuberculosis of the mamma.

Colonel O'Meara's elaborate Guide Book for Medical Service in India will be of great value to practitioners and students of medicine.[2] It is essentially a reference book, and that for daily use. The work is very comprehensive, and includes a Pharmacopœia, General Prescriptions, and Formulæ taken from the Pharmacopœias of Great Britain

[1] "Encyclopædia Medica." Second Edition. Under the general editorship of J. W. Ballantyne, M.D., C.M., F.R.C.P.E. Vol. VIII.: Labyrinth to Mammary Gland. Pp. x + 704, with 32 figs. Edinburgh: W. Green and Son, Ltd., 2, St. Giles Street. 1922. Price 30s. net.

[2] "Medical Guide for India and Book of Prescriptions." By Lieut.-Col. E. J. O'Meara, O.B.E., F.R.C.S. (Eng.), D.P.H. (Camb.), Civil Surgeon and Principal of the Medical School, Agra. Pp. vii + 718. Calcutta: Butterworth and Co. (India), Ltd., 6, Hastings Street. London: Butterworth and Co., Bell Yard, Temple Bar. 1921.

and other countries, a collection of "Prescriptions of Proved Value in Indian Practice," classified under the headings of "symptoms" or "disease." There are also conveniently arranged data regarding Doses of Vaccines; the Administration of Organic Arsenic Compounds; Quinine in the Treatment of Malaria; the Use of Emetine; Cholera Treatment by Rogers' Method; Treatment of Snake-Bite, Rabies, etc. There is a Directory to Sanatoria in India, and a set of Rules for the Home Treatment of Consumptives. There are also sections on Hydrotherapy, Massage, Weir-Mitchell Treatment, and many therapeutic measures. A particularly useful section is that which deals with Articles of Indian Diet and Methods of Preparation, and this is followed by directions for suitable dietaries in certain diseases. The volume also contains directions for the conduct of all kinds of tests, Examination for Life Insurance, and there are Tables of Weights and Measures and numerous miscellaneous formulæ. This all too brief enumeration of some of the practical features of this really monumental work of reference will be sufficient to indicate that this work is an indispensable one for all who seek to practise medicine effectively in India, and that medical advisers at home will find much in it which will be of daily service to them in the successful conduct of their practice.

A new and second edition of Dr. Georges Laurens' well-known, much-appreciated, practical, and thoroughly detailed work on Oto-Rhino-Laryngology has just been issued.[1] As Sir James Dundas-Grant indicates in his Foreword, in no British manual is there to be found such meticulous minuteness in the formulation of "What not to do" and "What to do." It is just the guide required by the general practitioner. And for the tuberculosis officer and all who have charge of tuberculous cases in hospitals and sanatoria the work should prove of the greatest service. A large number of these patients are the subjects of disorders or diseases of nose, ear, and throat, and only too frequently those responsible for their care have had but little experience in the diagnosis and treatment of lesions connected with the ear and the nasal and pharyngeal passages. This book provides just the information, guidance, and help which the majority of tuberculosis officers stand in need of. The illustrations alone make it an indispensable manual for the general practitioner. There is an excellent chapter on Respiratory Exercises. The section on Laryngeal Tuberculosis is particularly informing and serviceable, and there are a number of helpful illustrations, with several admirable formulæ. Reference is made to treatment by heliotherapy, which, it is stated, ought by preference to be carried out at a high altitude. All concerned in the preparation and production of this English version of Dr. Laurens' notable handbook merit warm congratulations.

[1] "Oto-Rhino-Laryngology for the Student and Practitioner." By Dr. Georges Laurens. Authorized English Translation of the Fourth Revised French Edition, by H. Clayton Fox, F.R.C.S. (Ireland). With a Foreword contributed by Sir J. Dundas-Grant, M.A., M.D., F.R.C.S. Second English Edition. Pp. xii + 350, with 589 illustrations. Bristol: John Wright and Sons, Ltd. 1922 Price 17s. 6d. net.

PREPARATIONS AND APPLIANCES.

THE MARR BI-AURAL STETHOSCOPE.

The accompanying illustration indicates the general form of the new MARR BI-AURAL STETHOSCOPE.[1] It is claimed for this patented improvement that it has the following advantages over existing bi-aurals: (1) Greater amplitude of vibrations to the ear. (2) That as no diaphragm is used to produce this increased amplitude, the true and natural tone of the sounds is conveyed, and without any distortion. (3) That the chest wall serves as the natural diaphragm. (4) That a variation of the volume of sound can be secured by slightly varying the pressure of the stethoscope. (5) That a faint pressure on the chest gives the best result. It is said that the high efficiency of this stethoscope is obtained by a concentration of the sound waves on the inner surface of the chest-piece, from whence they are carried to the ear by surface conduction. This, it is held, secures a greater amplitude of vibration on the tympanum. Certainly, the stethoscope proves very effective in actual use, and it is so simple in construction that there is nothing to get out of order. In auscultatory work it is specially adaptable and acute.

THE MARR BI-AURAL STETHOSCOPE.

HYGIENIC APPLIANCES AND THERAPEUTIC PREPARATIONS.

The NORVIC CRÊPE BANDAGES[2] are now available in widths of from 2 to 11 inches, and 6 yards in length. They will be found invaluable in hospitals and sanatoria, as well as in domiciliary and dispensary

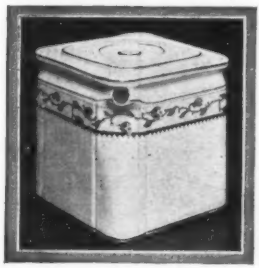
[1] The Marr Bi-Aural Stethoscope is supplied by Mayer and Phelps, Chiron House, 59 and 61, New Cavendish Street, W. 1. Price, chest-piece, 12s. 6d.; complete with ivory or rubber ear-pieces or stout tubing, £1 1s.

[2] The Norvic Crêpe Bandages are manufactured by Grout and Co., Ltd. (incorporating the Norwich Crape Co. (1856), Ltd.), Great Yarmouth, from whom full particulars can be obtained.

service, for all purposes in which binding is required. These bandages are inexpensive, can be repeatedly washed, are comfortable to wear, light and soft in texture, and provide a perfect substitute for rubber and elastic webbing. The Crêpe Bandage only requires to be used to be appreciated.

THE NORVIC CRÊPE BANDAGE.

The new square-shaped CUBE TEA-POT should be welcome in hospitals, sanatoria, and nursing homes.[1] It is just the thing for the breakfast or tea tray of the invalid. Indeed, in ordinary habitations it will be an acceptable acquisition. There is no ugly, offensive spout to get clogged and broken. It is practically a perfect cube, with handle, spout, and lid all sunk into the protecting level of a smooth, glossy surface. It pours excellently, is easily cleaned, is artistic in form, and can be obtained in a variety of colours.



CUBE TEA-POT.

"LANITE" EASY-FIX LEAD is an ingeniously devised form of thin strips of lead ready for attachment to windows. It is impervious to damp, heat, and cold, and by its use an inartistic, unattractive window may be made most pleasing. It will be found of service in connection with windows, bookcases, screens, etc., in hospitals and sanatoria, as well as for use in private houses.[2] Patients will find it effective for *passe-partout* picture-frames.

Patients undergoing open-air treatment and all lovers of Nature should procure THE VERETTE, a combined Pocket Microscope and Live Box.[3] This inexpensive, portable, effective little magnifier is a delightful companion for the conduct of observations on natural objects of the field, hedgerow, or garden. It is also useful for indoor study of fabrics, fibres, crystals, and the like. "The Verette" is fitted with a compound achromatic lens providing considerable magnification and a flat field. The detachable live box allows of the immediate examination of live insects, aquatic specimens, etc., taking objects ¾ inch in diameter. This ingenious pocket companion is an ideal present for a tuberculous patient.

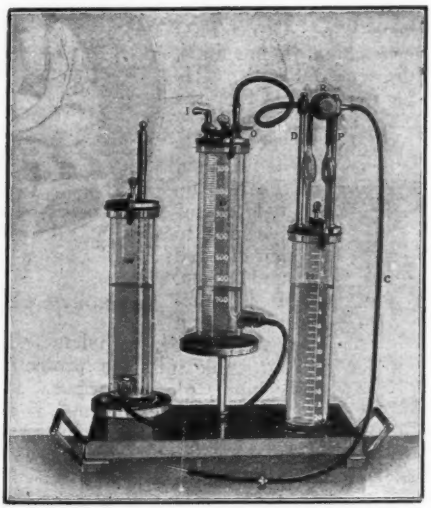
[1] Full particulars regarding the Cube Tea-pot can be obtained from Robert Johnson and Co., London Road, Leicester. The price ranges from 3s. to 10s. 6d., according to earthenware or china, and size.

[2] Particulars regarding the "Lanite" Easy-fix Lead, and the various ways in which it can be employed, may be obtained on application to Charles H. Haigh and Co., 29, Fenchurch Street, E.C. 3.

[3] The "Verette" Microscope is manufactured by Francis Brown, 25, Southbrooke Road, Lee, S.E. 12, and is supplied complete in morocco case, with full instructions, price 14s. 6d., postage 3d. extra.

THE PRODUCTION OF ARTIFICIAL PNEUMOTHORAX.

The accompanying illustration indicates the chief features of the apparatus manufactured by Messrs. Reynolds and Branson, of Leeds, at



THE WOODCOCK-FERNANDEZ APPARATUS FOR INDUCTION OF ARTIFICIAL PNEUMOTHORAX.

The above illustration shows the apparatus in position for inserting the needle, with the taps closed. *W*, Water cylinder. *G*, Gas cylinder with inlet tap *I* for filling *G* with gas, and outlet tap *O* connected through *R* to *C*. *M*, Manometer cylinder. *P*, Proximal manometer—*i.e.*, proximal to patient. *D*, Distal manometer. *R*, Differential pressure regulator. *C*, Rubber tube leading towards patient's chest, with glass cross-piece filter and needle attached.

the suggestion of Dr. H. de Carle Woodcock, and modified by Dr. Z. P. Fernandez.[1] It is stated that something like 6,000 operations have been carried out by this form of apparatus.

[1] An illustrated leaflet giving full particulars of the above apparatus will be sent to any medical adviser interested in the production of artificial pneumothorax if application is made to Reynolds and Branson, Ltd., 13, Briggate, Leeds. The price of the apparatus is £12 12s.

THE OUTLOOK.

TUBERCULOSIS—A NATIONAL PROBLEM.

TUBERCULOSIS not only wrecks the health, happiness, and efficiency of immense numbers of individual men, women, and children, but also entails economic loss, social derangement, and domestic disorder, and brings a burden upon the community which at the present time is so heavy that State effort and voluntary enterprise are inadequate to bear it. Important facts and valuable figures have recently been published in various reports. The Ministry of Health, in its last Annual Report, presents a summary of the present position of schemes and financial arrangements relating to England and Wales.[1] The terms of the Public Health (Tuberculosis) Act of 1921 are explained. A table is given indicating that up to March 31, 1922, there had been approved 204 institutions provided by local authorities and 233 by voluntary bodies, a total of 437, with a total of 18,844 beds. "Early in the financial year 1921-22 steps were taken to postpone the provision of new institutions, or the extension of existing institutions, except in so far as actual contractual obligations had been entered into, and the number of additional beds which have been, or are now being, provided under the terms of the circular letter of November 3, 1919, will not exceed 5,000. During the year capital grants were paid amounting to £295,034, making a total of £1,016,076; and loans were sanctioned amounting to £273,292 for the provision of institutions for the treatment of tuberculosis, making a total of £1,284,100 sanctioned up to March 31, 1922, for this purpose." The number of tuberculous ex-Service men receiving residential treatment under the special arrangements (in England) under the Ministry of Pensions on April 1 of the present year was 2,789, as compared with 3,559 on April 1, 1921. The total expenditure of Insurance Committees in England upon the residential treatment of tuberculous ex-Service men under the special arrangements administered by the committees during the period of 28 months from January 1, 1919, to April 30, 1921, amounted approximately to £960,000. The primary notifications of tuberculosis in England in 1921 were: Pulmonary, 56,334; non-pulmonary, 15,368. In the same year the deaths were: Pulmonary, 33,505; non-pulmonary, 9,173. A separate section of the report gives figures for Wales, and describes the tuberculosis services of the King Edward VII. Welsh National Memorial Association.

Sir George Newman, in his recently issued Annual Report,[2] devotes a special section to tuberculosis, in which he insists that "the basis of preventive action in regard to this disease must be, first, to fortify the powers of resistance of the individual to disease by sound nutrition, hygiene, and immunization; and, secondly, to prevent the spread of infection by persons or materials (including milk or meat)." And in order to fulfil these two primary conditions it is urged that "we must

[1] Third Annual Report of the Ministry of Health, 1921–22. Pp. xvi+166. London: H.M. Stationery Office, Imperial House, Kingsway, W.C. 2. Price 6s. net.

[2] "On the State of the Public Health." Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1921. Pp. 115.

adopt general methods conducive to the health of the community, and the particular methods of attack on tuberculosis (notification, dispensary, sanatorium, after-care, etc.)." As to the demand for increased economy and efficiency, the following statement appears: "It is obvious that what each authority must endeavour to obtain is better results in the way of both prevention and treatment, and a reduction of every form of uneconomical expenditure. It is satisfactory to know that important steps in these directions are being taken throughout the country, and a substantial reduction in the rate of expenditure will be secured, associated, it is hoped, with reduction of the disease." Statistics are given regarding the incidence and mortality of tuberculosis. There are also valuable paragraphs on the "Results of Residential Treatment" and "Care and After-Care." Reference is also made to the course intended to provide suitable vocational training for men who have had sanatorium treatment, so that they may be enabled to work on their own account in suburbs, country towns, or large villages. Sir George Newman's concluding words may well be quoted here: "Authorities and their tuberculosis officers are consolidating their arrangements, and are concentrating their attention on an improved practice of the dispensary and sanatorium system. That system, however excellent, is not, and cannot be, our sheet anchor. It is a method; it is one expression of a principle. The solution of the problem will be found in a social evolution, in the broad acceptance of the way of health, domiciliary and industrial. Tuberculosis is a harvest, the effect of a cause, a seed sown in a favourable soil. We must restrict the seed-sowing, and we must make the soil unfavourable and resistant."

Dr. W. H. Hamer, in his Report to the London County Council,[1] provides interesting statistics and information regarding tuberculosis in London, and the preventive and therapeutic measures which are being taken to cope with this scourge. The L.C.C., in accordance with the scheme of 1914, provides, or arranges for the provision of, residential treatment of tuberculous subjects, required through a public authority (other than Poor Law Guardians), and the Metropolitan borough councils provide or arrange for the provision of dispensary treatment. In 1920 the Council commenced to make arrangements for the provision of residential treatment of insured persons and discharged soldiers and sailors. Since May 1, 1921, the Council have become responsible for the residential treatment of all tuberculous persons in London. Observation beds for the selection of cases are reserved at the Brompton and Victoria Park Chest Hospitals. The cost is met by (1) an annual Treasury grant; (2) payment for ex-Service men; (3) a proportion of the moneys available to H.M. Government for distribution amongst local authorities in respect of the treatment of seamen; (4) a contribution of 50 per cent. by the Council after deduction of certain Government grants; (5) contributions in certain cases by patients or their friends. Statistics are presented, and there are particulars regarding the development of the dispensary system. A section is devoted to the consideration of open-air education, and information is afforded regarding measures for dealing with tuberculous and tuberculously disposed children.

[1] London County Council: Annual Report of the Council, 1921. Vol. III., Public Health (including the Report for the Year 1921 of the County Medical Officer of Health and School Medical Officer, Main Drainage and Housing). Pp. 82. London: P. S. King and Son, Ltd., 2 and 4, Great Smith Street, Victoria Street, Westminster, S.W. 1. 1922. Price 2s. 6d.

NOTES AND RECORDS.

A letter (Circular 334) has recently been addressed by the Chief Medical Officer of the Ministry of Health, Sir George Newman, to the various administrative tuberculosis officers, on the subject of "Vocational Training of Ex-service Men," in which it is stated that it has been ascertained from returns made to the Ministry of Health on Form T 76 that the number of cases of ex-service men recommended by tuberculosis officers to D.C's.M.S. (Tuberculosis) for vocational training in Course (1) mentioned in paragraph 1 of Circular 307 is largely in excess of the number of places which have been provided for this Course at the special training sections. The number of places available for vocational training in Course (1) is now being increased from 32 to 62, but the number of patients already recommended by tuberculosis officers exceeds 400. As all courses of vocational training must be completed by June 30, 1924, it is evident that it will not be practicable to give training under this scheme in Course (1) to all the patients recommended as suitable.

The Yorkshire Tuberculosis Society has issued an interesting 1922-23 programme. Sir Berkeley Moynihan remains President, and the Committee comprises: Dr. J. Rennie, Chief Clinical Tuberculosis Officer of Sheffield, Drs. Crowley (Otley), Rivers (Barnsley), Vallow (Bradford), Welch (Stanningley), de C. Woodcock (Leeds), and Allan Wilson, the Hon. Secretary, whose address is 143, Skipton Road, Keighley. The annual subscription is 6s., one shilling of which to be paid as affiliation fee to the Tuberculosis Society of Great Britain (Hon. Secretary, Dr. F. J. C. Blackmore, 138, Herbert Road, Plumstead, S.E.). Meetings are held at 4 p.m. on the last Saturday in each month as follows: October 28—Debate, "The Relationship of the Tuberculosis Service to Medical Officers of Health and General Practitioners," at Tuberculosis Dispensary, New Briggate, Leeds. Opened by Dr. T. H. Peyton, Chief Clinical Tuberculosis Officer, Cheshire. November 25—Lecture, "X Rays in the Diagnosis of Diseases of the Chest," at Tuberculosis Dispensary, near Midland Station, Sheffield. By Dr. R. Hallam, Radiologist, Sheffield Royal Hospital. January 27, 1923—Lecture, at Tuberculosis Dispensary, Leeds. By Dr. Henry Ellis. February 24—Lecture, "Tuberculosis of the Eye," at Tuberculosis Dispensary, Leeds. By Mr. A. Whitehead, F.R.C.S. March 24—Lecture, "Prevention and Treatment of Tuberculosis in Lancashire," at Tuberculosis Dispensary, Leeds. By Dr. Lissant Cox, Chief Clinical Tuberculosis Officer, Lancashire.

A course of lectures on tuberculosis for trained nurses, health visitors, and social workers, will be given on Tuesday and Friday, beginning October 10, at the Hospital for Consumption, Brompton. The lecturers are Drs. Hope Gosse, M. Davidson, L. S. T. Burrell, A. C. Inman, W. J. Fenton, Sir James Dundas-Grant, Drs. G. E. Beaumont, Stanley Melville, J. E. H. Roberts, R. C. Wingfield, S. S. Perkins, Miss Redl, and Miss Marx.

A National Milk Conference is to be held in the Council Chamber of the Guildhall, London, October 16 to 18. On Tuesday morning, October 17, Dr. A. Stanley Griffith, the Research Bacteriologist of the Medical Research Council, will deal with "Bovine Tuberculosis and its Relation to Man." Particulars from Miss H. M. Williams, Hon. Secretary, 3, Bedford Square, W.C. 1.

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